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PATENT SPECIFICATION



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266,472

Complete Accepted : Feb. 28, 1927.

COMPLETE SPECIFICATION.

Improvements in Roll Grinding Machines.

We, ALBERT ARNOLD BAKER, a citizen of the United States of America, of 93, South Cliff Street, Ansonia, Connecticut, United States of America, and FARREL
5 FOUNDRY & MACHINE COMPANY, a corporation organised and existing under the laws of the State of Connecticut, United States of America, located at 25, Main Street, Ansonia, Connecticut, United
10 States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

15 This invention relates to roll grinding machines, and more particularly to that class of grinding machines employed for grinding rolls such as are used, for instance, in connection with rolling
20 mills, calendering machines and other relatively heavy work, and particularly for rolls designed to be used upon heated material, such as hot steel plates, in which case the roll becomes heated and
25 expands and for this reason it is necessary to crown or concave the roll, so that the plates will not emerge from the rolls thinner at the central portion thereof than at the edges. In preparing rolls
30 of this character, the operation becomes a real grinding operation, as a considerable amount of material must be removed from the roll, as distinguished from a polishing or finishing operation sometimes performed when straight rolls are
35 redressed.

Machines of this character usually employ a carriage which travels to and fro over the bed of the machine upon
40 slides or ways; and where a considerable amount of material is removed from the roll, the grit and filings find their way to these slides or ways, and as a result the ways soon become so badly worn that
45 it is necessary to refinish them.

In prior machines of this character, the ways upon the bed have usually been V-shape in form, the vertex of the V

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being disposed lowermost, so that the way in effect constitutes a trough, and any
50 dirt, grit or filings falling upon these ways are carried to the bottom of this trough by the lubricant discharged thereupon, so that an accumulation of this
55 extraneous material occurs within the trough of the way and serves to shorten the useful period thereof on account of the increased wearing effect.

These drawbacks are lessened by a known construction in which the ways
60 are formed as an inverted V, the downward sloping sides of which are connected to a flat upper ridge.

In the construction according to the present invention the ways are provided
65 with downwardly sloping diverging sides whereby foreign materials falling thereon will tend to gravitate therefrom and means associated with the ways are provided for supplying a lubricant, whereby
70 the said ways are cleansed of any foreign materials.

A channel is provided in the central ridge of each way and a lubricant is supplied to the channel under pressure by
75 means of a longitudinal interior duct or passage provided in the base of each way.

The lubricant is returned to the reservoir through openings provided at the
80 ends of the ways.

Guards are disposed above the ways to further protect the ways from falling
85 grit and the reciprocating carriage is provided with openings through which the guards extend.

In the accompanying drawings:

Fig. 1 is a top plan view of a roll grinding machine embodying our improvements;

Fig. 2 is an end elevational view of
90 the same;

Fig. 3 is an end elevational view of the machine bed and carriage showing the inverted V-shaped ways;

Fig. 4 is a transverse sectional view
95 of one of the ways on line 4—4 of Fig. 5;

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Fig. 5 is a bottom plan view of one of the ways.

The figs. are drawn to different scales.

The particular embodiment of the invention which we have selected to illustrate in the accompanying drawings comprises a bed 10, which may be of any proper or suitable configuration or shape to properly support the various machinery designed to be carried thereon. The mechanism supported upon this bed may generally consist, as shown in Fig. 1 of a headstock A, a tailstock B, a reciprocating carriage C, having mounted thereon carriage operating and reversing mechanism D and grinding wheel mechanism E.

The headstock is provided with driving lugs 11 and a centring pin 12, between which and a centring pin 13 on the tailstock the roll to be ground is held in the proper position. The headstock may be rotated by a motor 14 through chain driving mechanism 15.

As shown in Fig. 1, the work supports, just described, are mounted at one side of the bed 10. Upon the other side are arranged two slides or ways 20 and 21, as shown more especially in Fig. 3, upon which the main carriage C is adapted to rest. Above these ways may be arranged suitable guards 22 and 23, so as to prevent, as far as possible, grit or other foreign material resulting from the grinding operation from falling upon the ways. The upper bearing surfaces of the ways, as shown in Figs. 3 and 4, are so arranged that the sides slope downwardly from an intermediate crest or ridge so that any dirt or grit falling thereon will have a tendency to work down the sloping sides of the ways and fall therefrom into channels 25, 26, 27 and 28 which extend lengthwise of the bed throughout the length of the ways. As shown in Fig. 4, the upper surfaces of these ways are formed in the shape of an inverted V in cross-section, the sloping sides 29 and 30 being inclined toward the intermediate crest or vertex 31.

Upon the lower side of the carriage C are provided bearing surfaces 32 and 33, complementally shaped relatively to the ways 20 and 21, so that an inverted trough is provided in the carriage, the sides of which bear evenly upon the sloping sides 29 and 30 of the ways 20 and 21. The carriage C is also provided with openings 34 and 35 through which the guards 22 and 23 extend, the guards being suitably supported by their ends beyond the range of the movement of the carriage.

As shown more particularly in Fig. 4,

the ways 20 and 21 are each provided with side flanges 40 and 41 by which they may be bolted to the bed 10. At the lower part of the way the latter is cored out to provide a lubricant channel 42, through which, as will be hereinafter described, lubricating material is forced through the way by a suitable pump. Longitudinally of this channel a strengthening web 43 extends lengthwise of the way, and at intervals laterally extending webs 44 and 45 join the web 43 to the sides of the oil channel 42.

Channels or bores 46 extend upwardly at intervals from the lubricating channel 42 to the ridge of the way, at which point the latter is slightly concave to provide a channel 47, so as to permit the oil to rise within the bore 46 and flow from the channel 47 downwardly over the inclined sides 29 and 30 so as to thoroughly cleanse the ways of grit or other impurities resulting from the grinding operation. It will be apparent that the channel extends throughout the length of the ways, and the oil or lubricant being distributed through this channel through the ducts 46 flows evenly therefrom over the entire bearing surface of the ways. The oil falling from the sides of the ways flows slowly or sluggishly through the return channels 25, 26, 27 and 28, so that its burden of foreign material held in suspension will be deposited in said channels, the oil falling through openings 49 and 50, shown at the ends of the ways in Fig. 1, to a reservoir or tank 51 within the bed.

As shown more particularly in Fig. 3, the oil is drawn from this reservoir through a strainer 52 and pipe 53 by a pump 54 to which the pipe leads, and is delivered by a delivery pipe 55 to branch pipes 56 and 57 connected to ducts 58 leading through the edges of the ways to the oil channel 42. The pump is operated by a belt 59 leading from a pulley 60 upon the shaft of a sprocket 61 driven by the sprocket chain 15 from the motor 14.

It will be observed that the oil channel 42 is closed at the end opposite the ducts 58 so that a pressure may be built up therein and cause the lubricant to rise in the ducts or bores 46 and emerge upon the ridge of the ways, so as to flow downwardly over the entire bearing surface thereof and cleanse this surface thoroughly of all grit, dirt or other impurities which are washed downwardly due to the sloping character of the bearing surface into the return channels. The grit settling in these channels may be quite readily removed from time to

time so as not to interfere too much with the carrying capacity thereof or the lubricant.

It will be understood that as shown and more fully described in the co-pending Application of Henry E. P. Taylor and Farrel Foundry & Machine Company, No. 30,191 of 1925 (261,918), the carriage C upon which the carriage driving and reversing mechanism D and the grinding wheel operating mechanism E are mounted is caused to reciprocate back and forth over the bed 10 so that the grinding wheel traverses the length of the roll supported between the headstock A and tailstock B. For this purpose, upon the carriage is provided the driving motor 63 and reversing mechanism 64 which it is not necessary to describe in detail in this application. The grinding wheel operating mechanism E includes a suitable crowning device, also described in the co-pending application referred to above, by which the rolls may be suitably crowned or concaved to the extent desired.

It will be obvious, also, that notwithstanding the relatively large amount of metal which must be ground off the rolls in a device of this character, the grit and dirt and impurities resulting therefrom will be constantly washed off the ways, due to the sloping form thereof and to the cleansing or washing action of the lubricant which is forced to the highest point upon the way and permitted to flow downwardly over the entire bearing surface thereof.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a roll grinding machine, a bed, a carriage adapted to reciprocate upon the bed, ways upon which the carriage is adapted to slide, said ways being provided with downwardly sloping diverging sides whereby foreign material falling thereon will tend to gravitate therefrom, and means associated with the ways for supplying a lubricant to the ways whereby the latter will be cleansed of foreign material.

2. A roll grinding machine according to the preceding claim, in which guards are disposed above the ways to prevent grit or the like falling on the said ways, and the carriage is provided with openings through which the guards extend.

3. A roll grinding machine according to the preceding claim, in which the lubricant is forced upwards to the central ridge from which the bearing surfaces slope downwardly and outwardly.

4. In a roll grinding machine according to Claim 3, a channel provided in the central ridge and means, arranged interiorly of the ways, for supplying a lubricant to the channel.

5. A roll grinding machine according to Claim 3 or Claim 4 in which return channels extend along each way to catch the drip of lubricant therefrom and a lubricant reservoir into which said channels empty.

6. In a roll grinding machine according to Claim 5, openings in the bed through which the lubricant received in the return channels flows into the reservoir and means to force the lubricant from the reservoir to the channels in the ridges.

7. A roll grinding machine according to Claim 6 in which each way is provided with interior ducts communicating with the channel in the central ridge and adapted to convey oil under pressure thereto from the reservoir.

8. A roll grinding machine according to Claim 7 in which the interior ducts extend longitudinally of the ways and supporting ribs are provided longitudinally in said ducts with laterally extended webs.

9. A roll grinding machine according to any of the preceding claims, in which the roll grinding and roll crowning mechanism is mounted on the reciprocating carriage.

10. A roll grinding machine, substantially as described with reference to the accompanying drawings.

Dated this 30th day of November, 1925.

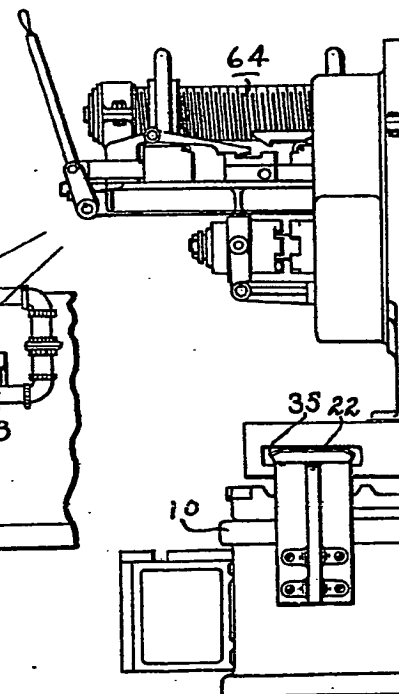
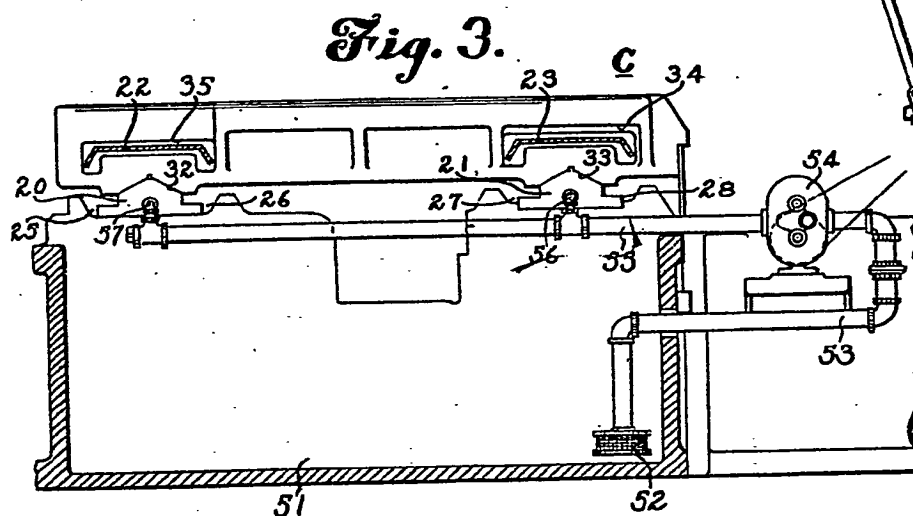
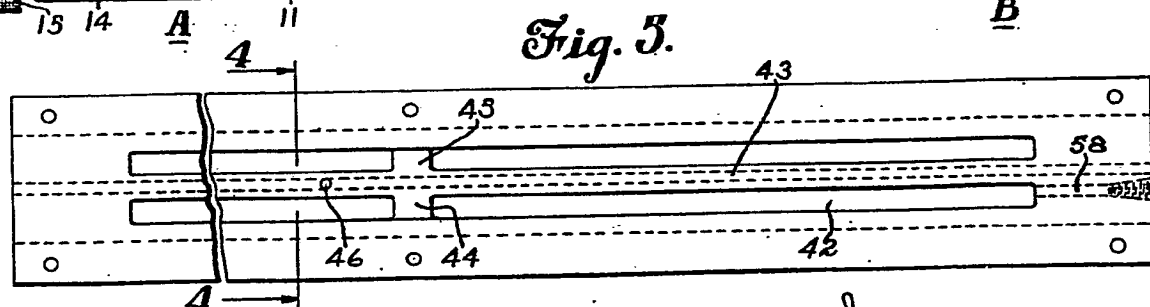
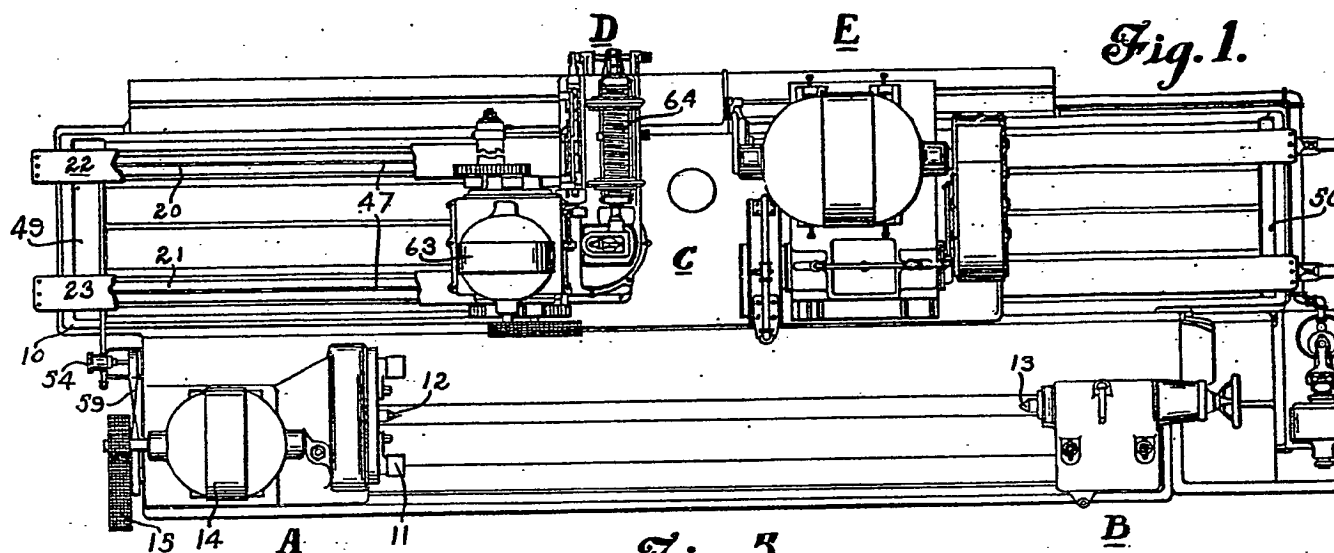
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Agents for the Applicants.

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Fig. 1.

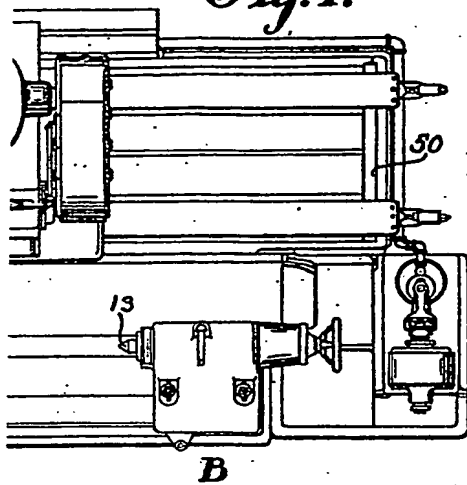


Fig. 4.

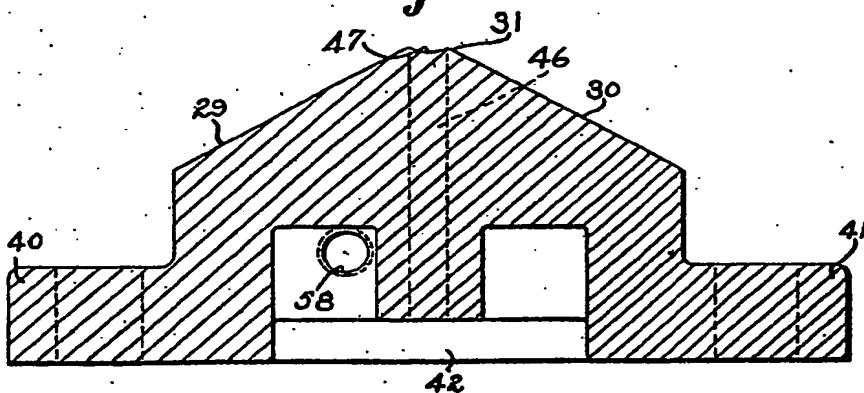
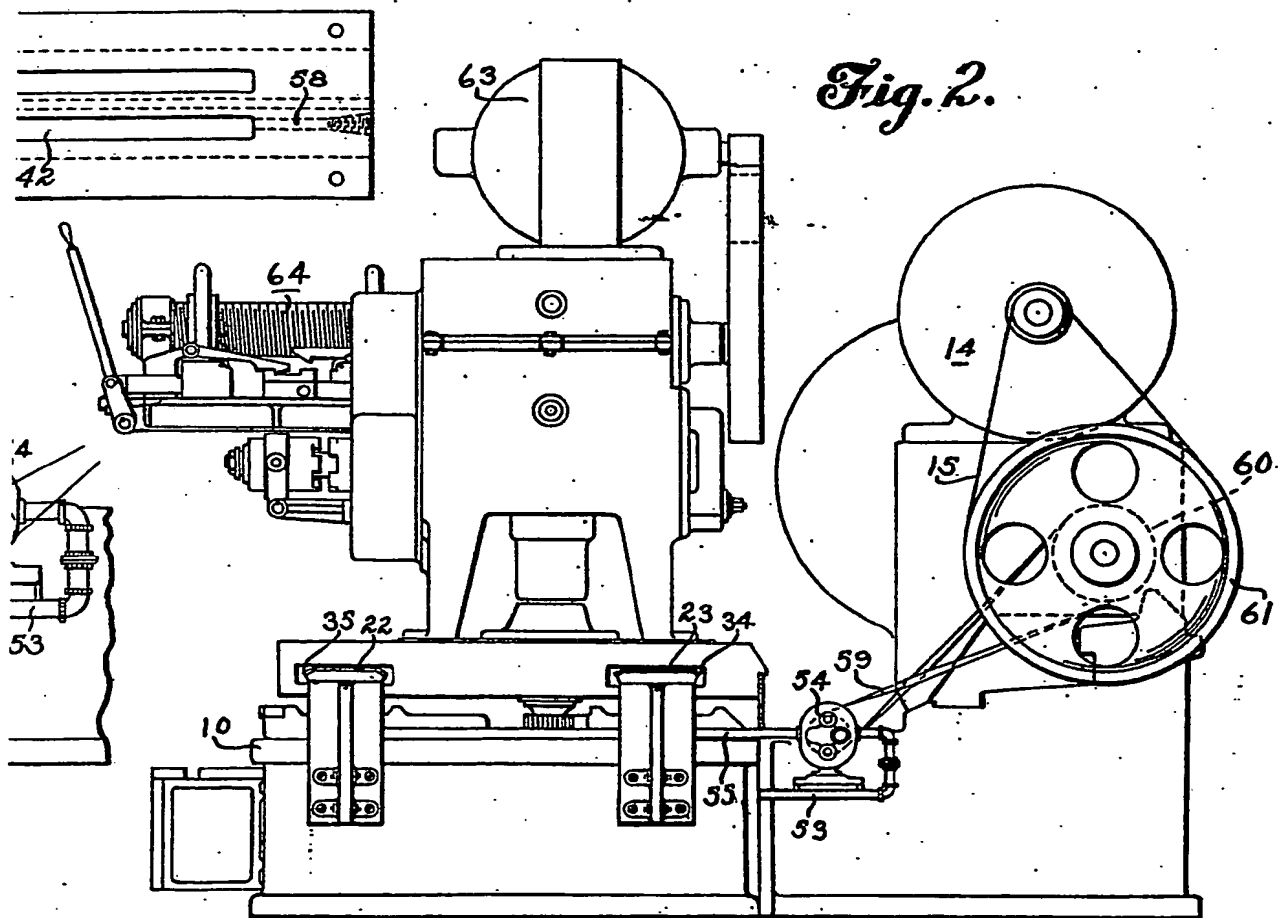


Fig. 2.



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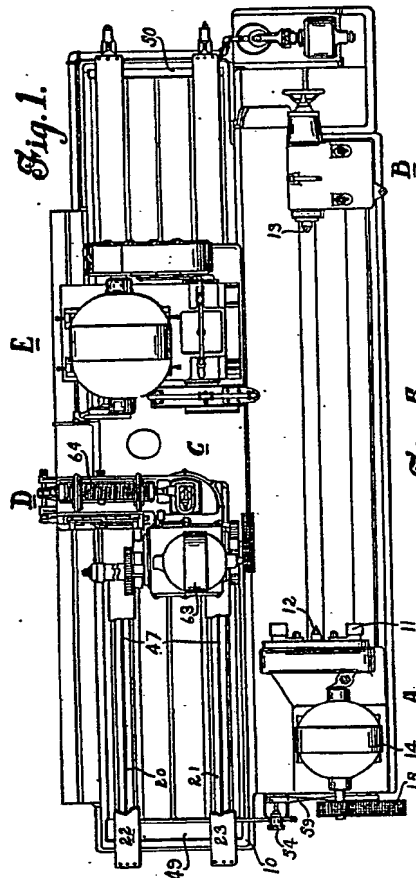


Fig. 1.

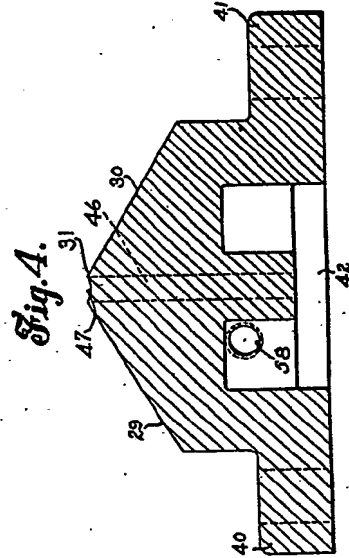


Fig. 4.

Fig. 3.

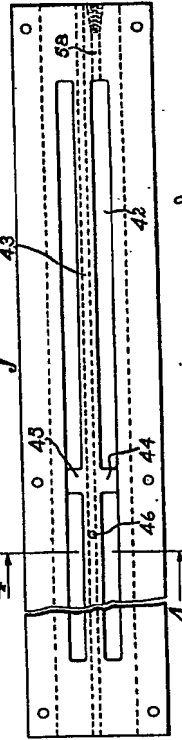


Fig. 2.

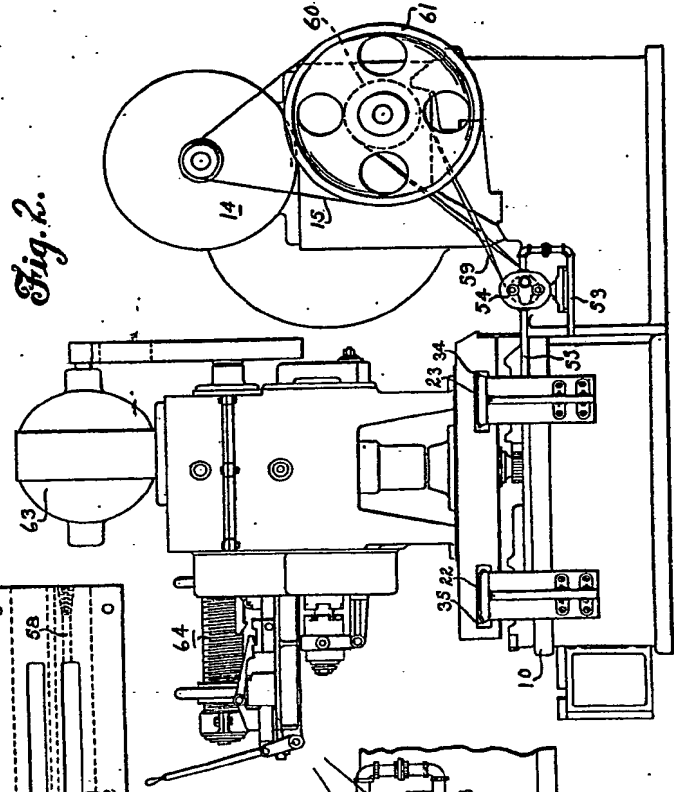
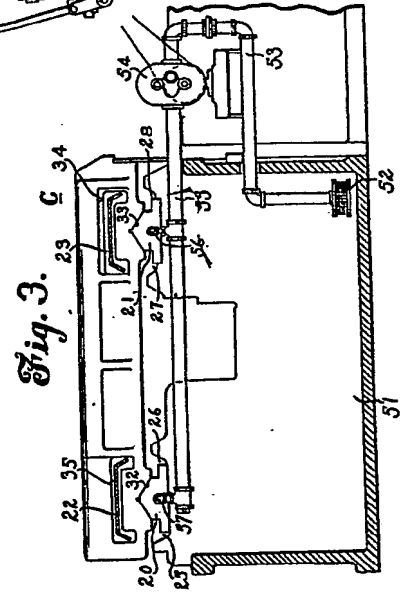


Fig. 3.



[This Drawing is a reproduction of the Original on a reduced scale]